



ALTERNATIVE TO PTO/SB/08a/b (08-03)

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)				<b>Complete If Known</b>	
				Application Number	10/617,624
				Filing Date	July 10, 2003
				First Named Inventor	Eduardo Blumwald
				Art Unit	1638
				Examiner Name	<del>To Be Assigned</del> VINOD KUMAR
Sheet	1	of	6	Attorney Docket Number	529642000500

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
WJ	1.	US 4,616,100	10-07-1986	McHughen et al.	
WJ	2.	US 5,272,085	12-21-1993	Young et al.	
WJ	3.	US 5,346,815	09-13-1994	Krulwich et al.	
WJ	4.	US 5,441,875	08-15-1995	Hediger	
WJ	5.	US 5,563,246	10-08-1996	Krulwich et al.	
WJ	6.	US 5,563,324	10-08-1996	Tarczynski et al.	
WJ	7.	US 5,639,950	06-17-1997	Verma et al.	
WJ	8.	US 5,689,039	11-18-1997	Becker et al.	
WJ	9.	US 5,750,848	05-12-1998	Kruger et al.	
WJ	10.	US 5,780,709	07-14-1998	Adams et al.	
WJ	11.	US 5,859,337	01-12-1999	Gasser et al.	
WJ	12.	US 6,861,574	03-01-2005	Fukuda et al.	
WJ	13.	US 20030046729 A1	03-06-2003	Blumwald et al.	
WJ	14.	US 20050028235 A1	02-03-2005	Zhang et al.	
WJ	15.	US 20050032112 A1	02-10-2005	Fukuda et al.	
WJ	16.	US 20050144666 A1	06-30-2005	Blumwald et al.	
WJ	17.	US 20050155105 A1	07-14-2005	Blumwald et al.	
WJ	18.	US 11/065,977	FD 02-24-2005	Blumwald et al.	
WJ	19.	US 10/620,061	FD 07-14-2003	Blumwald et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				
WJ	20.	EP 1143002 A1	10-10-2001			
WJ	21.	WO 91/06651	05-16-1991			
WJ	22.	WO 96/39020	12-12-1996			
WJ	23.	WO 97/13843	04-17-1997			
WJ	24.	WO 99/47679	09-23-1999			
WJ	25.	WO 00/37644	06-29-2000			

\*EXAMINER: Initial if information considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

Examiner Signature	<i>Vinod Kumar</i>	Date Considered	9/1/2005
--------------------	--------------------	-----------------	----------

sf-1866952

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)			<b>Complete if Known</b>		
			Application Number	10/617,624	
			Filing Date	July 10, 2003	
			First Named Inventor	Eduardo Blumwald	
			Art Unit	1638	
			Examiner Name	To Be Assigned VINOD KUMAR	
Sheet	2	of	6	Attorney Docket Number	529642000500

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>	
VK	26.	AL-KARAKI, Ghazi N. (2000) "Growth, Water Use Efficiency, and Sodium and Potassium Acquisition by Tomato Cultivars Grown Under Salt Stress," Journal of Plant Nutrition, 23(1):1-8		
VK	27.	APSE ET AL. (2002) "Engineering salt tolerance in plants" Current Opinion in Biotechnology 13: pp. 146-150.		
VK	28.	APSE ET AL. (1999) "Salt tolerance conferred by overexpression of a vacuolar Na <sup>+</sup> /H <sup>+</sup> antiport in Arabidopsis" Science 285 (5431): pp. 1256-1258.		
VK	29.	APSE ET AL. (1998) "Cloning and Characterization of Plant Sodium/Proton Antiports" 11 International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K. (Abstract).		
VK	30.	APSE ET AL. (1998) "Identification of two putative sodium/proton antiports in Arabidopsis" Plant Membrane Biology Workshop August 1998, Cambridge, U.K. (Poster).		
VK	31.	APSE, Maris et al. (Jun. 1998) "Cloning and Characterization of a Plant Sodium/Proton Antiport," Annual Meeting of the American Society of Plant Physiologists, Madison, Wisconsin, USA. (abstract)		
VK	32.	BARKLA ET AL. (1995) "Tonoplast Na <sup>+</sup> /H <sup>+</sup> antiport activity and its energization by the vacuolar H <sup>+</sup> -ATPase in the halophytic plant Mesembryanthemum crystallinum L." Plant Physiol. 109: pp. 549-556.		
VK	33.	BARKLA ET AL. (1994) "The plant vacuolar Na <sup>+</sup> /H <sup>+</sup> antiport" Symp. Soc. Exp. Biol. 48: pp. 141-153.		
VK	34.	BLUMWALD (2000) "Sodium transport and salt tolerance in plants" Current Opinion in Cell Biology 12: pp. 431-434.		
	35.	BLUMWALD ET AL. (Dec. 1998) "Cloning of plant sodium/proton antiports in Arabidopsis" Eastern Regional Meeting of the Canadian Society of Plant Physiologists, Toronto. (Oral Presentation)		
	36.	BLUMWALD ET AL. (Jun. 1998) "Cloning and Characterization of a Plant Sodium/Proton Antiport" Annual Meeting of the American Society of Plant Physiologists, Madison, Wisconsin, USA. (Oral Presentation)		
	37.	BLUMWALD ET AL. (Aug. 1998) "Cloning and characterization of a plant sodium/proton antiports" 11 International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K. (Oral Presentation)		
	38.	BLUMWALD ET AL. (Aug. 1998) "Cloning and characterization of a plant sodium/proton antiports" Gordon Conference on Drought and Salinity Stress in Plants, Oxford, UK. (Oral Presentation)		
VK	39.	BOHNERT ET AL. (1996) "Strategies for engineering water-stress tolerance in plants" Trends in Biotechnology 14(3): pp. 89-97.		

Examiner Signature	<i>Vinod Kumar</i>	Date Considered	9/1/2005
--------------------	--------------------	-----------------	----------

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<b>Complete if Known</b>			
		Application Number	10/617,624		
		Filing Date	July 10, 2003		
		First Named Inventor	Eduardo Blumwald		
		Art Unit	1638		
		Examiner Name	To Be Assigned <i>Vinod Kumar</i>		
Sheet	3	of	6	Attorney Docket Number	529642000500

<i>✓</i>	40.	BORGESE ET AL. (1992) "Cloning and expression of a cAMP-activated Na <sup>+</sup> /H <sup>+</sup> exchanger: evidence that the cytoplasmic domain mediates hormonal regulation" PNAS USA 89: pp. 6765-6769.	
<i>✓</i>	41.	BORK (2000) "Powers and Pitfalls in Sequence Analysis: the 70% Hurdle" Genome Research, Vol. 10: pp. 398-400.	
<i>✓</i>	42.	BOWIE ET AL. (1990) "Deciphering the Message in Protein Sequences: Tolerance to Amino Acid Substitutions" Science, Vol. 247, pp. 1306-1310.	
<i>✓</i>	43.	BRANT ET AL. (1997) Human Na <sup>+</sup> /H <sup>+</sup> exchanger isoform NHE3 composite cDNA: GenBank Accession Number T51330.	
<i>✓</i>	44.	BROUN ET AL. (1998) "Catalytic Plasticity of Fatty Acid Modification Enzymes Underlying Chemical Diversity of Plant Lipids" Science, Vol. 282: pp. 1315-1317.	
<i>✓</i>	45.	COUNILLON ET AL. (May 1993) "A Point Mutation of the Na <sup>+</sup> /H <sup>+</sup> Exchanger Gene (NHE1) and Amplification of the Mutated Allele Confer Amiloride Resistance Upon Chronic Acidosis" Proc. Natl. Acad. Sci. USA 90(10): pp. 4508-12.	
<i>✓</i>	46.	COVITZ ET AL. (Nov. 1997) Expressed sequence tags from a root hair-enriched Medicago truncatula cDNA library: GenBank Accession Number AA660573.	
<i>✓</i>	47.	CUARTERO, Jesus et al. (1999) "Tomato and Salinity," Scientia Horticulturae, 78:83-125	
<i>✓</i>	48.	DANTE ET AL. (1997) "AF007271": Arabidopsis thaliana BAC TM021B04: EMBL Database Accession Number AF007271.	
<i>✓</i>	49.	DARLEY ET AL. (1998) "ANA1 a Na <sup>+</sup> /H <sup>+</sup> Antiporter From Arabidopsis?" 11th International Workshop on Plant Membrane Biology, August 1998, Cambridge, U.K.	
<i>✓</i>	50.	DIETRICH ET AL. (1997) Sequence of s. cerevisiae lambda 3641 and cosmids 9461, 9831, and 9410: GenBank Accession Number 927695.	
<i>✓</i>	51.	FUKUDA ET AL. (Aug. 1999) "AB021878" Oryza sativa (Japonica cultivar-group) OsNHX1 mRNA: EMBL Database Accession Number AB021878.	
<i>✓</i>	52.	FUKUDA ET AL. (1999) "Molecular Cloning and Expression of the Na <sup>+</sup> /H <sup>+</sup> Exchanger Gene in Oryza Sativa" Biochim. Biophys. Acta. 1446 (1-2): pp. 149-55.	
<i>✓</i>	53.	FUKUDA ET AL. (1998) "Na <sup>+</sup> /H <sup>+</sup> Antiporter in Tonoplast Vesicles from Rice Roots" Plant Cell Physiol. 39: pp. 196-201.	
<i>✓</i>	54.	FUKUDA ET AL. (Mar. 2001) "The Functional analysis of the rice Na <sup>+</sup> /H <sup>+</sup> antiporter gene" Plant Cell Physiol. 42 (Supp.): p. s210.	
<i>✓</i>	55.	GAXIOLA ET AL. (1999) "The Arabidopsis thaliana proton transporters, AtNhx1 and Avp1, can function in cation detoxification in yeast" PNAS USA 96 (4): pp. 1480-1485.	
<i>✓</i>	56.	GAXIOLA ET AL. (1999) "AF106324" Arabidopsis thaliana sodium proton exchanger Nhx1 mRNA, partial cds.: GenBank Accession Number AF106324	
<i>✓</i>	57.	GISBERT, Carmina et al. (May 2000) "The Yest HAL1 Gene Improves Salt Tolerance of Transgenic Tomato," Plant Physiology, 123:393-402	
<i>✓</i>	58.	GORDON-KAMM ET AL. (1990) "Transformation of Maize Cells and Regeneration of Fertile Transgenic Plants" Plant Cell 2: 603-618.	
<i>✓</i>	59.	GUO, Haiwei H. et al. (June 22, 2004) "Protein Tolerance to Random Amino Acid Change," PNAS, 101(25):9205-9210	

 Examiner  
Signature

*Vinod Kumar*

 Date  
Considered

9/1/2005

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<b>Complete if Known</b>			
		Application Number	10/617,624		
		Filing Date	July 10, 2003		
		First Named Inventor	Eduardo Blumwald		
		Art Unit	1638		
		Examiner Name	To Be Assigned Vinod Kumar		
Sheet	4	of	6	Attorney Docket Number	529642000500

✓	60.	HAHNENBERGER ET AL. (1996) "Functional expression of the Schizosaccharomyces pombe Na <sup>+</sup> /H <sup>+</sup> antiporter gene, sod2, in Saccharomyces cerevisiae" PNAS USA 93: pp. 5031-5036.
✓	61.	HIEI ET AL. (1994) "Efficient Transformation of rice mediated by Agrobacterium and sequence analysis of the boundary of the T-DNA" Plant J. 6: pp. 271-82.
✓	62.	HILL ET AL. (1998) "Functional Analysis of Conserved Histidines in ADP-Glucose Pyrophosphorylase from Escherichia coli" Biochem. Biophys. Res. Comm. 244: pp. 573-577.
✓	63.	ICHIDA et al. (1996) "Increased Resistance to Extracellular Cation Block by Mutation of the Pore Domain of the Arabidopsis Inward-rectifying K <sup>+</sup> Channel KAT1" J. Membrane Biol. 151: pp. 53-62.
✓	64.	JACOBY (Aug. 23, 1999) "Botanists design plants with a taste for salt" Chemical Engineering News: p. 9.
✓	65.	KADYRZHANOVA ET AL. (1995) Sequences for STS primer sets: GenBank Accession Number L44032.
✓	66.	KAUFMAN (July 31, 2001) "A New Strain of Tomatoes, And Don't Hold the Salt" Washington Post: p. A03.
✓	67.	KINCLOVA ET AL. (2001) "Functional study of the Saccharomyces cerevisiae Nha1p C-terminus" Mol. Microbiol. 40 (3): pp. 656-668.
✓	68.	LAZAR ET AL. (1988) "Transforming Growth Factor α: Mutation of Aspartic Acid 47 and Leucine 48 Results in Different Biological Activities" Molecular and Cellular Biology 8: pp. 1247-1252.
✓	69.	LIU ET AL. (2000) "Partial Deletion of a Loop Region in the High Affinity K <sup>+</sup> Transporter HKT1 Changes Ionic Permeability Leading to Increased Salt Tolerance" J. Biol. Chem. 275 (36): pp. 27924-27932.
✓	70.	MASER, Pascal et al. (2001) "Phylogenetic Relationships within Cation Transporter Families of Arabidopsis," Plant Physiology, 126:1646-1667
✓	71.	MURPHY, L. et al. (Nov. 4, 1998) "Direct Submission Schizosaccharomyces Pombe Chromosome I Sequencing Project," GenBank Accession No. 3850064
✓	72.	NASS ET AL. (Aug. 1998) "Novel Localization of a Na <sup>+</sup> /H <sup>+</sup> Exchanger in a late Endosomal Compartment of Yeast" J. Biol. Chem. 273 (33): pp. 21054-60.
✓	73.	NASS ET AL. (Oct. 1997) "Intracellular Sequestration of Sodium by a Novel Na <sup>+</sup> /H <sup>+</sup> Exchanger in Yeast Is Enhanced by Mutations in the Plasma Membrane H <sup>+</sup> - ATPase" J. Biol. Chem. 272 (42): pp. 26145-26152.
✓	74.	NEWMAN ET AL. (1998) "AC T75860": Arabidopsis cDNA clone of Lambda-PRL2: EMBL Database Accession Number AC T75860.
✓	75.	NUMATA ET AL. (Mar. 1998) "Identification of a Mitochondrial Na <sup>+</sup> /H <sup>+</sup> Exchanger" J. Biol. Chem. 273 (12): pp. 6951-9.
✓	76.	O'CONNOR (Aug. 14, 2001) "Altered Tomato Thrives in Salty Soil" New York Times.
✓	77.	OHKI ET AL. (1995) "AC D49589": EMBL Database Accession Number AC D49589.

Examiner Signature	<i>Vinod Kumar</i>	Date Considered	9/1/2005
-----------------------	--------------------	--------------------	----------

sf-1866952

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<b>Complete if Known</b>			
		Application Number	10/617,624		
		Filing Date	July 10, 2003		
		First Named Inventor	Eduardo Blumwald		
		Art Unit	1638		
		Examiner Name	To Be Assigned VINOD KUMAR		
Sheet	5	of	6	Attorney Docket Number	529642000500

✓	78.	OHKI ET AL. (1995) "Preference of recombination sites involved in the formation of extrachromosomal copies of the human alphoid Sau3A repeat family" Nucleic Acids Res. 23: pp. 4986-4994. 4971-4977.
✓	79.	OHTA, Masaru et al. (2002) "Introduction of a Na <sup>+</sup> /H <sup>+</sup> Antiporter Gene from <i>Atriplex Gmelini</i> Confers Salt Tolerance to Rice," FEBS Letters 26785:1-4
✓	80.	ORLOWSKI AND GRINSTEIN (Sep. 1997) "Minireview: Na <sup>+</sup> /H <sup>+</sup> Exchangers of Mammalian Cells" J. Biol. Chem. 272 (36): pp. 22373 - 22376.
✓	81.	PLANTSP (2002) "PlantsP: Functional Genomics of Plant Phosphorylation-PlantsP Protein 27103" Retrieved (Feb 5, 2005) from Jan 26, 2005 <a href="http://plantsp.sdsc.edu/cgi-bin/detail.cgi?db=plantsp&amp;plantsp_id=27103">http://plantsp.sdsc.edu/cgi-bin/detail.cgi?db=plantsp&amp;plantsp_id=27103</a> .
✓	82.	RAUSCH ET AL. (1996) "Salt stress responses of higher plants: The role of proton pumps and Na <sup>+</sup> /H <sup>+</sup> -antiporters" Journal of Plant Physiology 148 (3-4): pp. 425-433.
✓	83.	RHOADS ET AL. (1998) "Regulation of the cyanide-resistant alternative oxidase of plant mitochondria" J. Biol. Chem. 273 (46): pp. 30750-30756.
✓	84.	RUBIO ET AL. (1999) "Genetic Selection of Mutations in the High Affinity K <sup>+</sup> Transporter HKT1 That Define Functions of a Loop Site for Reduced Na <sup>+</sup> Permeability and Increase Na <sup>+</sup> Tolerance" J. Biol. Chem. 274 (11): pp. 6839-6847.
✓	85.	RUS, A.M. et al. (2001) "Expressing the Yeast HAL1 Gene in Tomato Increases Fruit Yield and Enhances K <sup>+</sup> /Na <sup>+</sup> Selectivity Under Salt Stress," Plant, Cell and Environment, 24:875-880
✓	86.	SANTA-MARIA, Guillermo E. et al. (Dec. 1997) "The HAK1 Gene of Barley is a Member of a Large Gene Family and Encodes a High-Affinity Potassium Transporter," The Plant Cell, 9:2281-2289
✓	87.	SASAKI ET AL. (Apr. 1998) Rice cDNA from panicle C91832: Genbank Accession Number C91832. C04 April 2002
✓	88.	SASAKI ET AL. (Apr. 1998) Rice cDNA from panicle C91861: GenBank Accession Number C91861.
✓	89.	SCHACHTMAN ET AL. (1997) "Molecular and functional characterization of a novel low-affinity cation transporter (LCT1) in higher plants" PNAS USA 94: pp. 11079-11084.
✓	90.	SEKI ET AL. (2002) RAFL6 Arabidopsis thaliana cDNA clone: GenBank Accession Nos.: AV785096 and AV798305.
✓	91.	STRATHMANN ET AL. (1989) "Diversity of the G-protein family: sequences from five additional alpha subunits in the mouse" Natl. Acad. Sci. USA 86: pp. 7407-7409.
✓	92.	TRAVIS, J. (Aug. 4, 2001) "Gene Makes Tomatoes Tolerate Salt," Science News, 60:68
✓	93.	WADITEE ET AL. (2001) "Halotolerant Cyanobacterium Aphanothece Halophytica Contains an Na <sup>+</sup> /H <sup>+</sup> Antiporter, Homologous to Eukaryotic Ones, with Novel Ion Specificity Affected by C-terminal Tail" J. Biol. Chem. 276 (40): pp. 36931-36938.
✓	94.	WEST, D.W. et al. (1984) "Response of Six Grape Cultivars to the Combined Effects of High Salinity and Rootzone Waterlogging," J. Amer. Soc. Hort. Sci. 109(6):844-851

Examiner Signature	Vinod Kumar	Date Considered	9/1/2005
--------------------	-------------	-----------------	----------

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(Use as many sheets as necessary)</i>				<b>Complete if Known</b>	
				Application Number	10/617,624
				Filing Date	July 10, 2003
				First Named Inventor	Eduardo Blumwald
				Art Unit	1638
				Examiner Name	<del>To Be Assigned</del> Vinod Kumar
Sheet	6	of	6	Attorney Docket Number	529642000500

✓	95.	WOOD ET AL. (Nov. 1998) Direct submission schizosaccharomyces pombe chromosome I sequencing project: GenBank Accession Number CAB10103.	
✓	96.	YAMAMOTO ET AL. (Oct. 1998) Rice cDNA from green shoot: GenBank Accession Number AU032544.	
✓	97.	YOKOI ET AL. (2002) Arabidopsis thaliana Na <sup>+</sup> /H <sup>+</sup> exchanger 5 (NHX5) mRNA: GenBank Accession Number AF490589.	
✓	98.	ZANDONELLA (Jul. 2001) "Gene modified tomato revels in salty soils" New Scientist. Retrieved Feb. 23, 2002, from < <a href="http://www.newscientist.com/channel/health/gm-food/dn1092">http://www.newscientist.com/channel/health/gm-food/dn1092</a> >.	
✓	99.	ZHANG ET AL. (2001) "Engineering salt-tolerant Brassica plants: Characterization of yield and seed oil quality in transgenic plants with increased vacuolar sodium accumulation" PNAS USA 98 (22): pp. 12832-12836.	
✓	100.	ZHANG ET AL. (2001) "Transgenic salt-tolerant tomato plants accumulate salt in foliage but not in fruit" Nature Biotechnology 19: pp. 765-768.	

\*EXAMINER: Initial if information considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Applicant's unique citation designation number (optional). <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

Examiner Signature	<i>Vinod Kumar</i>	Date Considered	9/1/2005
--------------------	--------------------	-----------------	----------